

**CONSTRUCTION AND ANALYSIS OF
GRADIENT CONTROL WELL PW-1 AND
RCRA GROUNDWATER MONITORING
WELLS MW-5 AND MW-6**

Prepared for:

**BERMITE DIVISION
WHITTAKER CORPORATION**
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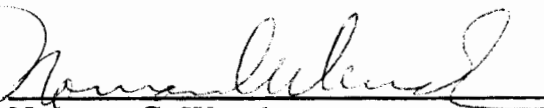
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September 1989

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of California.


Norman C. Wenck



Registration Number 41317

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I. INTRODUCTION

This report provides documentation on the construction of the gradient control well PW-1 and RCRA groundwater monitoring wells MW-5 and MW-6 which have been installed in fulfillment of the Groundwater Quality Assessment Program required at the Bermite facility (see Figure 1). Detection of low levels of trichloroethylene (TCE) in the existing RCRA groundwater monitoring well MW-4 in April 1989 led to the development and submittal, in accordance with 40 CFR Part 265.93, of "Specific Plan, Groundwater Quality Assessment Program," June 1989. The Specific Plan detailed the location and construction of wells MW-5 and MW-6. The Specific Plan and a letter to the California Department of Health Services, dated May 19, 1989, presented details on the location and construction of well PW-1. A copy of this letter is included as Appendix A.

The purpose of this report is to provide documentation on the construction of these wells and present groundwater quality and operating results of the wells since the time of installation. Samples of representative groundwater from MW-5 and MW-6 have been collected and analyzed for the hazardous constituents detected in MW-4 in April 1989. A aquifer test was performed using wells PW-1 and MW-4 and these results are presented. A granular activated carbon filter has been installed at the discharge of well PW-1 in anticipation of pumping and treating groundwater. Details of the filter are presented.

II. CONSTRUCTION OF PW-1

A. Drilling Methods

1. General

The construction of gradient control well PW-1, located approximately 76 feet east of MW-4 (see Figure 2), began on May 16, 1989. The well was drilled by Beylik Drilling, license #306291, based in LaHabra, California. Prior to drilling, all drilling equipment (drill collars, pipe, bits, etc.) were high-pressure steamed cleaned by Beylik Drilling.

2. Drilling

PW-1 was drilled using a 12 1/4 inch tricone bit. The well was drilled to an elevation of approximately 813 feet by mud rotary drilling. Quick-gel drilling fluid was used to assist in the removal of cuttings and for borehole wall stability. A product information sheet on quick-gel is included as Appendix B.

B. Screen/Casing

1. Screen

The screen for PW-1 is 6-inch diameter, carbon steel with a slot size of 0.060 inches. Two 20 foot and one 10 foot sections of slotted pipe were welded together to give an overall screen length of 50 feet.

The bottom of the screen was placed at an elevation of 813 feet. Centralizers were placed at the bottom of the screen in the middle and at the top of the screen.

2. Casing

The casing for PW-1 is carbon steel, 6 inch diameter in 40 foot lengths. The casing is welded to the screen and at each joint.

Centralizers were placed at 40 foot intervals along the total length of the casing.

C. Filter Pack/Seal

The filter pack for PW-1 consists of Lone Star Industries Medium Aquarium sand and was placed by a tremie line. A 5-foot layer of #30 silica sand was placed above the filter pack with another 5 foot layer of Enviro Plug on top of the silica sand. The #30 sand was used to assure that the Enviro Plug would not infiltrate into the filter pack and screen.

The remainder of the annulus was sealed with a lean cement grout. Because of the depth of the well, the annulus was sealed over a two-day period.

D. Development of PW-1

The well was developed by airlifting and surging until sediment free water was obtained. The development process took approximately six (6) hours and the water was considered developed when no sediment was measured with an Imhoff settling cone. Due to rapid recharge of the well, no water was added to the well during development. Water removed from the well during development was discharged onto the ground surface.

E. Aquifer Test

1. Methods

An aquifer test was performed to determine aquifer characteristics of transmissivity and storativity. The well PW-1 was used as the pumping well and well MW-4 was used as an observation well. A submersible pump was installed in PW-1 for the test.

PW-1 was pumped at a rate of 85 gallons per minute and the drawdown in PW-1 and MW-4 were measured with electronic water level meters. The well was pumped for 300 minutes at which time the pump was turned off. The recovery of the water levels in the wells was also measured.

The drawdown and recovery data and the aquifer characteristics determined from them are presented in Appendix D.

2. Results

As shown in Appendix D, consistent values of transmissivity (T) were calculated from the two wells for both the drawdown and recovery portions of the aquifer test. These values are consistent with values of T calculated by the USGS (1972) for the Saugus aquifer.

Values of storativity (S) were calculated and are within an order of magnitude of one another. These values are considered representative of confined aquifer conditions.

F. Granular Activated Carbon Filter

A granular activated carbon (GAC) filter has been installed at the discharge of well PW-1. The filter contains approximately 1200 pounds of GAC and is rated for a flowrate of 70 gallons per minute. The filter unit is 54 inches in diameter, 60 inches high and is equipped with a 75-micron prefilter which can be backwashed.

III. CONSTRUCTION OF MW-5 AND MW-6

A. Drilling Method

1. General

The construction of MW-5 and MW-6, located approximately 250 feet northwest and 300 feet north of MW-4 respectively, began on June 23, 1989 (see Figure 2). The wells were drilled by Beylik Drilling, license #306291 based in LaHabra, California. Prior to drilling, all drilling equipment (drill collars, pipes, bits, etc.) was high pressure steam cleaned by Beylik Drilling.

2. Drilling

Monitoring wells MW-5 and MW-6 were drilled using a 9 7/8 inch tricone bit. MW-5 was drilled to a depth of 663 feet and MW-6 was drilled to 697 feet below grade. These depths were chosen so that the screened interval of these wells would be the same as well MW-4.

The cuttings and drilling mud from the borings were stored in plastic lined roll-off boxes. These storage containers were leased from Martin Industrial Pumping, Incorporated, located in Canyon County, California.

Prior to the disposal of the cuttings and drilling mud, a representative composite sample was analyzed for the presence of metals and VOCs. The laboratory results show the contents of the boxes to be non-hazardous. The non-hazardous waste was transported by Martin Industrial Pumping Incorporated to Liquid Waste Management,

Incorporated, McKittrick, California. Appendix C includes the laboratory results and manifests of the drilling fluids and cuttings.

B. Logging of Wells

Electric logging of well MW-5 and MW-6 took place on July 10, 1989, and June 28, 1989, respectively. A spontaneous potential log, resistivity log, gamma-guard log, and caliper log were performed on both wells by Welenco Well Engineering Surveys. Copies of the logs are included in Appendix E. As with earlier wells drilled at Bermite, interpretation of the logs is difficult. The logs indicate that the soils alternate between sands with some clay to clay with very little sands. The logs do not indicate a definite change from unsaturated to saturated soils, which change was also notably absent during the actual drilling of MW-5 and MW-6. A log of drilling cuttings was kept by the on-site geologist. These logs are included in Appendix E.

C. Sieve Analysis

Prior to the placement of the screens, a sieve analysis was performed on a representative soil sample from both wells by Roscoe Moss Company, Los Angeles, California. The results of the analyses were used to choose a proper screen and filter pack for the wells. Copies of the analyses are included as Appendix F.

D. Screen/Casing

1. Screen

The screens for MW-5 and MW-6 were purchased from Roscoe Moss Company. The screens are 4-inch diameter by 20-foot length, continuous slot stainless steel (wire

wrapped) with a .060 inch slot. The 20-foot screens are comprised of two 10-foot sections welded together with stainless steel welding rod. The screen is attached to the casing with a welded stainless steel joint.

The top of the screen in monitoring well MW-5 was placed at a depth of 630 feet, which corresponds to an elevation of 858 feet. In monitoring well MW-6 the top of the screen is set 660 feet below the surface, which corresponds to an elevation of 858 feet.

Stainless steel centralizers were placed at the bottom and the top of the screen.

2. Casing

The casing for monitoring wells MW-5 and MW-6 was provided by Roscoe Moss Company. The casing sections are 4-inch in diameter by 21 foot length stainless steel, Schedule 5. The individual sections of casing were connected with welded joints. Approximately three feet of casing remains above ground at both wells. The screen and casing for MW-6 were set in place June 30, 1989. Monitoring well MW-5 was screened and cased July 11, 1989.

Stainless steel centralizers were placed at 40-foot intervals along the total length of the casing.

The screens and casing were high pressure steam cleaned, on site, by Beylik Drilling. After the screen and casing were cleaned, they were placed on clean plastic sheeting until placement into the well.

E. Filter Pack/Seal

1. Filter Pack

The filter pack utilized in both wells conforms with the sieve analysis. The material used is produced by Lone Star Industries and is classified as Medium Aquarium.

An ample quantity of sand was used for the pack to assure that at least two feet of material remained above the screen after development. The caliper log and a 15 - 20 percent reduction due to settling and loss through the screen during development were considered in determining the quantity of material necessary for a sufficient pack.

The sand was placed by a tremie line. During placement, the filter pack level was continuously sounded (measured) to assure that the sand was being properly placed and no voids in the filter pack were created.

2. Seal

The annular seal immediately above the filter pack is comprised of a continuous Benseal/E mud slurry sealing system. The slurry was placed in MW-5 and MW-6 at the depth intervals of 60 - 623 feet and 30 - 652 feet respectively. Product information sheets on the slurry sealing system are presented in Appendix B. The remaining annular space of both wells is filled with a neat cement grout. A concrete surface seal and protective posts were constructed around the well casing. Both wells have been surveyed and top of casing elevations and coordinates for all of the RCRA wells at the 317 Area are included in Table 1.

As-builts diagrams of MW-5 and MW-6 are included as Figures 3 and 4.

F. Development of MW-5 and MW-6

1. Purpose

Development of MW-5 and MW-6 was performed to insure a proper hydraulic connection to the aquifer.

2. Development

The development of MW-5 and MW-6 consisted of bailing, swabbing, and pumping. The first phase in the development process was to bail the heavy sediments from the water column. After the water began to clear, bailing was ceased and swabbing took place; swabbing is a means of mechanical surging. The swab is lowered into the screened area and pulled upward at a rate of approximately 3 feet per second. Water is forced into the formation above the swab and drawn into the screen below the swab. The swab is used to clean fine material from the well and the surrounding formation. Bailing followed swabbing until the water cleared, and the procedure was repeated until most of the suspended material was removed.

After the bailing/swabbing phase, the wells were pumped with a submersible pump until the water was clear. The time for development of each well was 12 hours for MW-5 and 16 hours for MW-6.

G. Groundwater Quality

1. Sampling

The groundwater from both wells MW-5 and MW-6 has been sampled for VOCs. The sampling was in accordance (as applicable) with the approved Groundwater Sampling and Analysis Plan for Bermite. Temporary piston pumps, similar to those installed at wells MW-1 and MW-4, were installed in wells MW-5 and MW-6.

Each well was evacuated of potentially stagnant water for approximately 18 hours followed by a 24-hour period of a lower sampling flowrate of 100 ml/minute. The evacuation flowrate was approximately 1.5 gallons per minute.

Upon sufficient time for evacuation, a representative groundwater sample was collected in three (3) 40-ml amber glass vials from each well. The sample was collected through a teflon sample valve and stem and was collected in a manner to reduce agitation of the sample. No air space was allowed in the sample containers.

2. Analysis

The two groundwater samples were each analyzed by EPA Method 601 (GC/MS) by FGL Environmental, Santa Paula, California. Laboratory reports of these samples are included as Appendix G.

No VOC were detected in the samples at the very low detection limit of 0.5 ug/l (part per billion).

H. Sample Pumps

Permanent sample pumps have been installed in MW-5 and MW-6. The pumps are piston pumps, the same as the pump in well MW-4. The drive mechanism for the pumps are electrical versus pneumatic for MW-4.

IV. REFERENCES

United States Geological Survey, Water Resources Investigation in the Saugus-Newhall Area, Open File Report 72-320, February 10, 1972.

TABLES

TABLE 1
WELL ELEVATIONS AND COORDINATES
BERMITE DIVISION - WHITTAKER CORPORATION

Well Description	Well Elevation (ft.)* (Top of Casing)	Well Coordinates	
		Northing	Easting
MW-1	1561.32	3937.0280	13858.4889
MW-2	1424.17	3498.2255	12409.7385
MW-3	1538.51	3332.4837	13420.1627
MW-4	1538.43	4057.4528	13416.5150
MW-5	1493.37	4223.9131	13225.1533
MW-6	1521.09	4363.1771	13384.0940
PW-1	1510.00	4058.7189	13492.8914

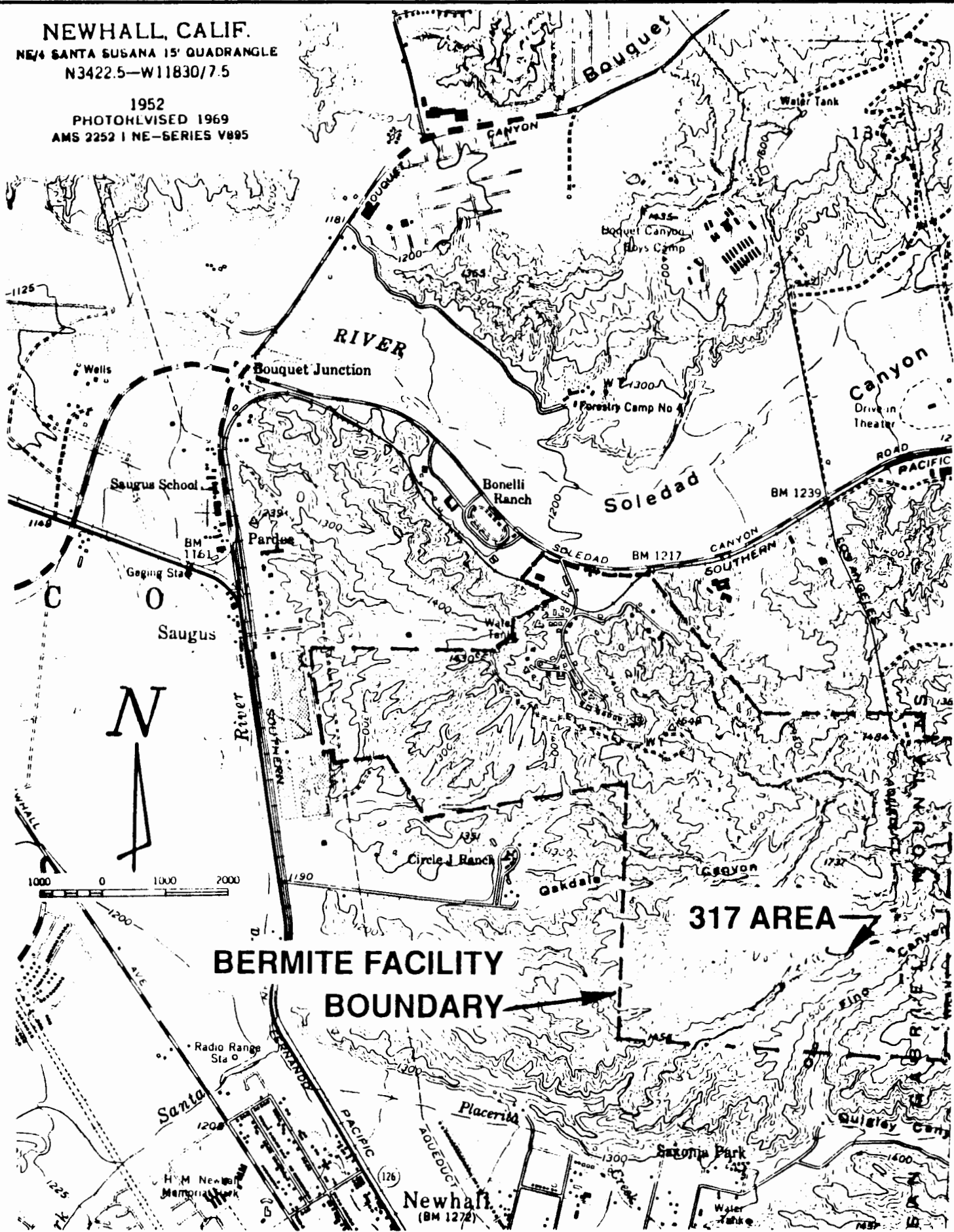
* Referenced to National Geodetic Vertical Datum

FIGURES

NEWHALL, CALIF.

NE 1/4 SANTA SUSANA 15' QUADRANGLE
N3422.5-W11830/7.5

1952
PHOTOHLVISED 1969
AMS 2252 I NE-SERIES V895



BERMITE DIVISION - WHITTAKER CORPORATION

Site Plan



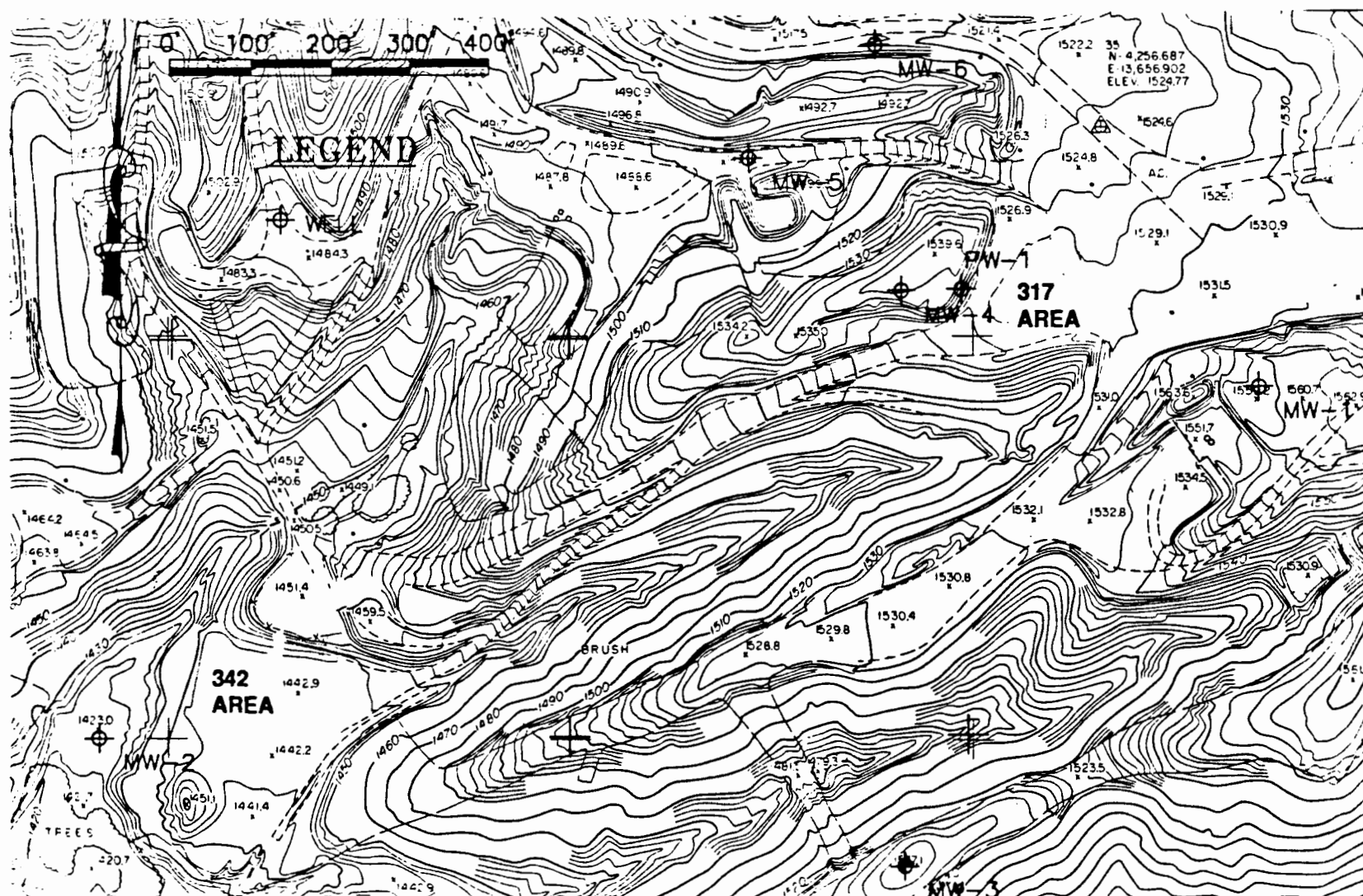
Wenck Associates, Inc.

Consulting Engineers

Twelve Oaks Center
15500 Wayzata Blvd.
Wayzata, MN 55391

SEP 1989

Fig. 1



BERMITE DIVISION - WHITTAKER CORPORATION

Well Location Map



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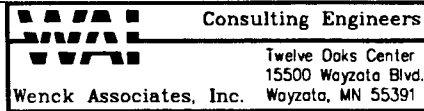
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15500 Wayzata Blvd.
Wayzata, MN 55391

SEP 1989

Fig. 2

PROJECT: BERMITE



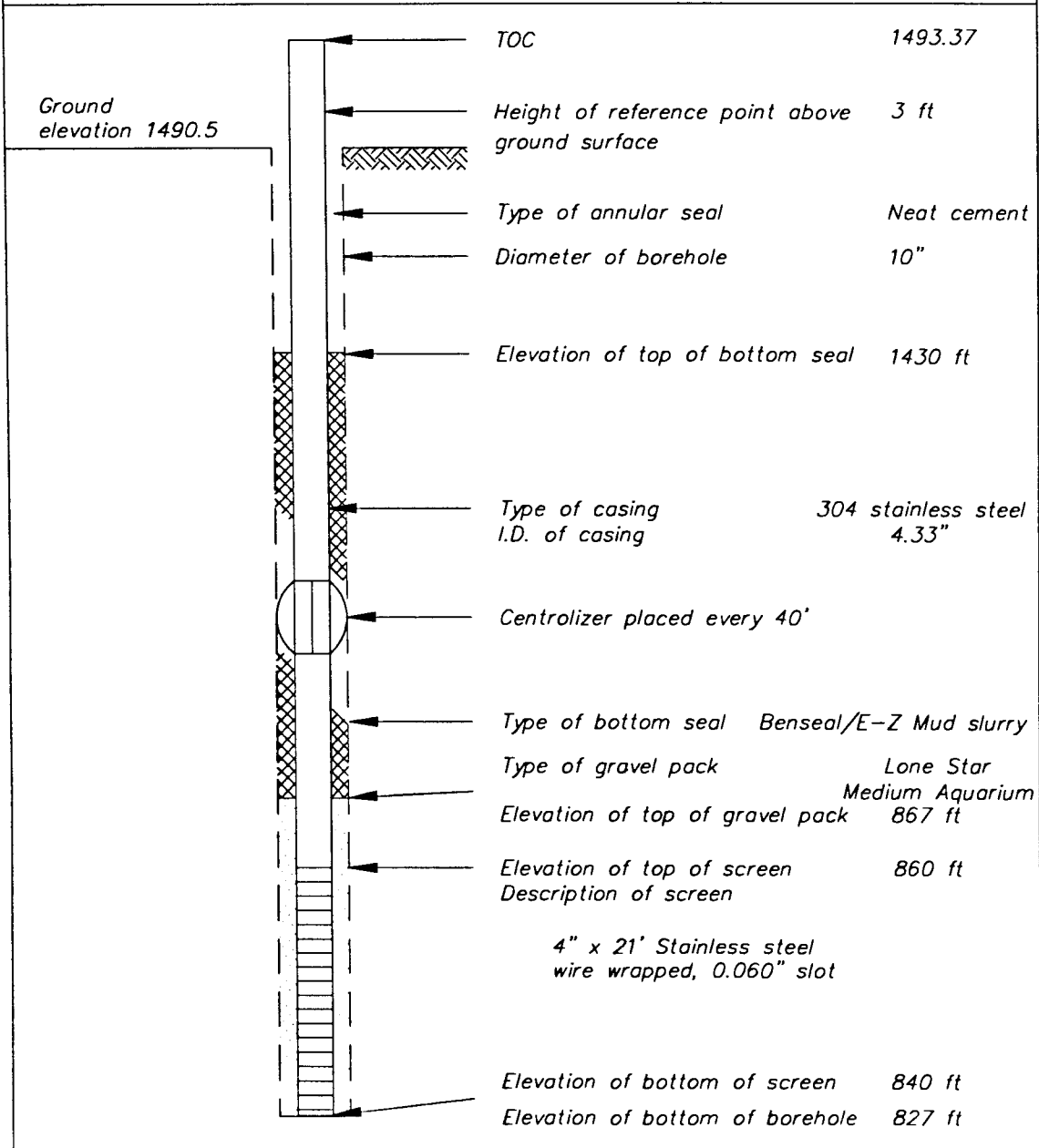
WELL NO.: MW-5

SITE: 317 AREA

DATE OF COMPLETION: JULY 10, 1989

SUPERVISED BY: GREGORY W. SMITH

NOT TO SCALE



BERMITE DIVISION - WHITTAKER CORPORATION

As-Built Diagram - Well MW-5



Wenck Associates, Inc.

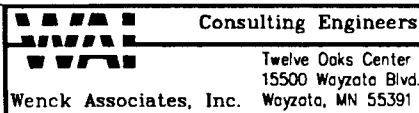
Consulting Engineers

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15500 Wayzata Blvd.
Wayzata, MN 55391

SEP 1989

Fig. 3

PROJECT: BERMITE



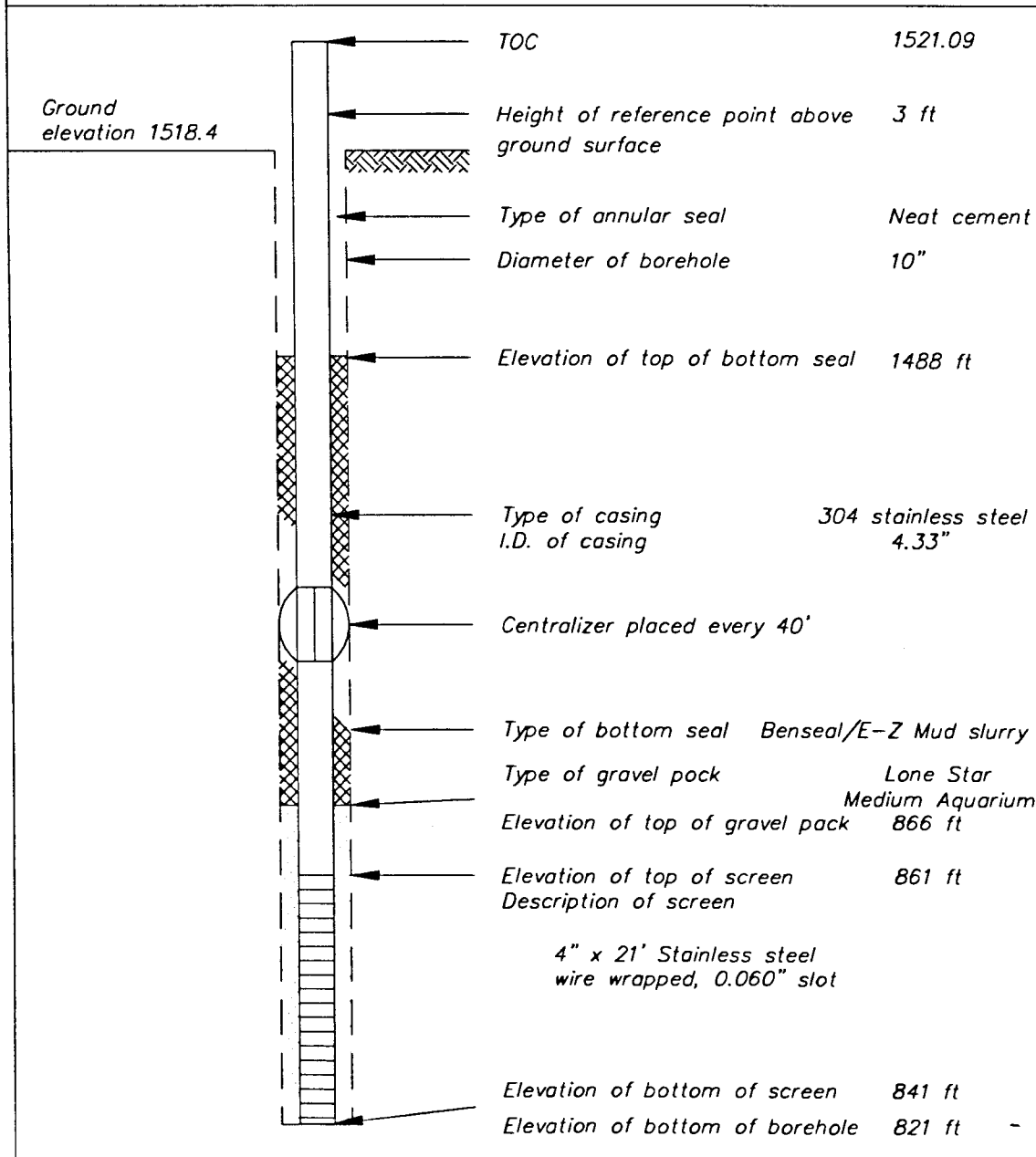
WELL NO.: MW-6

SITE: 317 AREA

DATE OF COMPLETION: JUNE 28, 1989

SUPERVISED BY: GREGORY W. SMITH

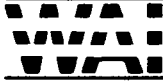
NOT TO SCALE



APPENDICES

APPENDIX A

Letter to Alan Sorsher, California Department of Health Services
Regarding Installation of Well PW-1, dated May 19, 1989



Wenck Associates, Inc.

May 19, 1989

Consulting Engineers
(612) 475-0858
FAX - (612) 476-0504

Mr. Alan Sorsher
Department of Health Services
Toxic Substances Control Division III
1405 North San Fernando Boulevard, Suite 300
Burbank, California 91504

Re: Groundwater Investigation at 317 Area
Bermite Division, Whittaker Corporation

Dear Mr. Sorsher:

The most recent groundwater sampling event was completed between April 17 and April 19, 1989. While not all analytical results have been received from the laboratories, we have received the results for the volatile organic compounds. All of the four monitoring wells show non-detectable concentrations of the compounds analyzed except monitoring well MW-4. This well is located downgradient and adjacent to the 317 Area. Trichloroethylene (TCE) was detected at a concentration of 4.8 mg/l in MW-4. A copy of the laboratory report is attached for your review. This was the first time in more than one year of sampling that organic compounds have been detected in any of the four groundwater monitoring wells. In an effort to verify this unexpected result, monitoring well MW-4 was resampled for volatile organic compounds. The well was purged and sampled in accordance with the sampling and analysis plan. The sample was submitted to a different laboratory than normally used for the groundwater analyses for Bermite. This laboratory (West Coast Analytical) has confirmed the presence of TCE in MW-4 at a concentration of 7.2 mg/l (see laboratory report, attached).

As a result of the recent detection of TCE, we are proceeding with the installation of a groundwater recovery well. The well will be installed in a location between monitoring well MW-4 and the 317 Area. The well location will be surveyed and we will provide you with an accurate location map when the information is available.

The recovery well will be screened from an elevation of approximately 863 feet to 813 feet with a six inch diameter, 0.06 slot screen and cased with a six inch steel casing.



Wenck Associates, Inc.

Mr. Alan Sorsher

Page Two

May 19, 1989

Consulting Engineers
(612) 475-0858
FAX - (612) 476-0504

The well will be developed by airlifting and surging.

At this time, our plan is to install the well and perform a pumping test to determine appropriate aquifer characteristics. We will then develop a program for groundwater removal and treatment.

If you have any questions regarding these matters, please do not hesitate to call.

Sincerely,

WENCK ASSOCIATES, INC.

Christopher F. Thompson, P.E.

CFT/cmk

cc: Gordon Louttit - Whittaker
Glen Abdun Nur - Bermite
Michael Fernandez - EPA Region IX

APPENDIX B

Drilling Fluid Product Information Sheets

NL Baroid

Drilling Fluids Products

QUIK-GEL®

Viscosifier

QUIK-GEL® viscosifier is a finely ground, premium-grade western sodium bentonite, specially processed to promote ease of mixing and superior mud-making qualities in fresh water.

Recommended Uses

In Fresh Water or In Freshwater-based Drilling Fluids

Increasing hole-cleaning capabilities.

Forming on permeable sections of the well bore a thin filter cake that can be removed easily by backflushing.

Promoting hole stability in poorly consolidated and caving formations.

Reducing water seepage in permeable formations.

Avoiding or overcoming loss of circulation.

In Fresh Water

Making an economical, single-sack, low-solids drilling fluid.

Making gel-foam for air drilling.

Major Advantages

Effectiveness. QUIK-GEL® viscosifier makes more than twice as much mud of the same viscosity as an equal weight of API-standard bentonite.

Fast yield. QUIK-GEL viscosifier reaches high viscosity quickly.

Easy mixing. QUIK-GEL viscosifier saves time and effort in making mud.

Convenience. The 50-pound (22.7 kg) bag is easy to handle.

Environmental acceptability. QUIK-GEL viscosifier is not toxic and does not ferment.

Recommended Treatment

See table below.

Approximate Amounts of QUIK-GEL® Viscosifier Added to Fresh Water or to Freshwater Drilling Fluids

	lb/100 gal	lb/bbl	kg/m ³
Added to Fresh Water			
Under normal drilling conditions.	15-25	6-11	15-30
In gravel or other poorly consolidated formations.	25-40	12-18	35-50
To stop loss of circulation.	35-45	15-20	40-55
Added to Freshwater Mud			
To improve performance: for better hole cleaning, thinner filter cake, and increased hole stability.	5-10	2-5	6-14

Method of addition: Preferably, mix by adding slowly through a jet mixer or high-speed stirrer. If such mixing equipment is not available, sift QUIK-GEL viscosifier slowly into the liquid close to the pump suction while circulating.

Packaging

QUIK-GEL® viscosifier is packaged in multiwall, water-resistant paper bags containing 50 pounds (22.7 kg).

Availability

QUIK-GEL® viscosifier may be purchased through any NL Baroid Service Center or from the Houston plant.

QUIK-GEL is a registered trademark of NL Industries, Inc.
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DMD 34
Printed in U.S.A.

This product is environmentally safe. (See back of page).

NL Baroid, P.O. Box 1675, Houston, Texas 77251

NL Baroid

Product Information

BENSEAL™/EZ-MUD® SLURRY

Sealing and Plugging System

The BENSEAL/EZ-MUD Slurry is a patented technique that provides a simple, inexpensive method for the effective sealing and grouting of boreholes, well casings and earthen structures. This slurry system delays swelling of bentonite, reduces pumping pressure, and allows higher concentrations of sealing solids to be placed in the application.

Recommended Uses:

The BENSEAL/EZ-MUD slurry provides superior qualities for:

- Sealing and grouting** of plastic and steel casing.
- Sealing engineering and hydrologic** test and instrument boreholes.
- Sealing conductor pipe** on drilling operations.
- Sanitary sealing** in water well construction.
- Plugging and abandoning exploration boreholes** for minerals, water and seismic exploration.
- Controlling loss of circulation** in drilling wells.

Major Advantages:

- Convenient to use.** BENSEAL™ bentonite and EZ-MUD® polymer are safe and easy to use.
- Stable in storage** reducing waste and cost.
- Contains no contaminants,** is non-toxic, does not spoil or ferment.
- Delays gellation.** Maximum number of bentonite solids delivered and allowed to swell in place.
- Reduced pump pressure.** Maximum number of solids at minimum circulating pressure, no formation fracturing.
- No heat of hydration.** No heat damage to plastic casing.
- Pumped with rig equipment.** Special equipment not needed.
- Permanent, flexible seal.** Prevents commingling of aquifers and entry of surface contaminants. Not subject to permanent shrinking, drying or cracking.
- Low density/flexible density.** Slurry weight 9 lb/gal, density adjusted by addition of BAROID® weight material.
- Does not flash set.**
- Allows hole reentry** without mud contamination.

Mixing and Applications Procedures:

For mixing use a 250 to 300 gallon open top metal tank

(i.e., stock watering trough). Arrange tank so one end is lower, place pump suction in lower end. (See Diagram A.) To pump the BENSEAL/EZ-MUD Slurry use a piston, diaphragm or screw type pump. *Never use a centrifugal type pump.*

Measure and calculate all volumes prior to starting. Have available a ready supply of water or EZ-MUD water to flush pumping system as needed.

Mix in this sequence only:

1. To each 100 gallons of water add uniformly one (1) quart of EZ-MUD polymer and stir well.
2. *Slowly* add BENSEAL bentonite to EZ-MUD/water mixture *stirring gently* with a mortar hoe or paddle mixer (no faster than 40 rpm) until lumps are broken up. (See Diagram B.) *Do not agitate.* On the average 1-1/2 pounds of BENSEAL bentonite is added for each gallon of EZ-MUD/water mixture (i.e., 150 pounds per 100 gallons).
3. Start pumping to the hole as soon as the slurry is mixed or, if possible, during mixing. **Caution:** from the time BENSEAL bentonite is added, application must be completed within 20 minutes.
4. 200 gallons is the largest size batch of slurry to mix and pump at one time. After each batch immediately flush pump, hoses and slurry delivery tubes with fresh or EZ-MUD/water mixture.

Sealing Casing:

Apply BENSEAL/EZ-MUD Slurry through a slurry emplacement tube (i.e., a small diameter string of pipe or hose with a joint of pipe for weight) inserted down the annular space between the hole wall and casing to the bottom of the hole. Fill the annulus uniformly from the bottom up, withdrawing the emplacement tube slowly as the slurry is discharged.

NOTE: in sealing casing, make sure a "casing shoe shut-off" is or has been established between the bottom of the casing and the hole. This ensures that the sealing slurry remains in the annulus.

Plugging and Abandoning Bore Holes:

Pump prepared slurry through open ended drill pipe (remove inner tube on core holes), filling hole from bottom up. Do not allow pipe to become stuck in slurry due to excess immersion.

Loss of Circulation While Drilling:

Mix and apply BENSEAL/EZ-MUD Slurry through open ended drill pipe into and through the zone of lost circulation. Lost circulation materials such as MICATEX® or WALL-NUT® can also be added to the slurry; reduce BENSEAL bentonite to not less than 1 pound per gallon (i.e., 100 pounds per 100 gallons). After pumping slurry fill hole with water or drilling fluid, wait 15 to 30 minutes, then continue drilling with reduced pump pressure.

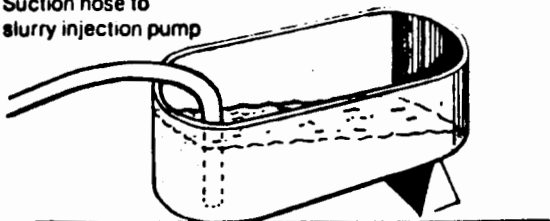
Lost circulation may, at times, require more than one application.

Volumes:

Diameter (inches)	Gallons/ Foot	Feet/ Gallons
2	0.17	5.88
3	0.38	2.63
4	0.67	1.49
5	1.05	0.95
6	1.51	0.66
7	2.06	0.49
8	2.69	0.37
9	3.40	0.29
10	4.20	0.24
11	5.08	0.20
12	6.05	0.17

NOTE: drill holes in unconsolidated materials are often washed out to next larger average size.

Suction hose to
slurry injection pump



**Diagram A - BENSEAL™/EZ-MUD®
Slurry Mixing Tank.**
Stir/mix with hoe or shovel.

Packaging:

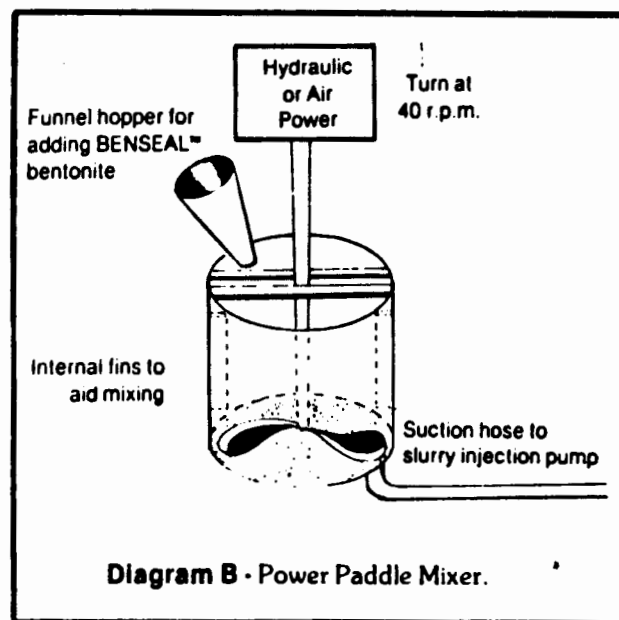
BENSEAL sealing and plugging agent is packaged in multi-walled, water resistant paper bags containing 50 pounds (22.7 kg). EZ-MUD liquid polymer is packaged in 5 gallon (18.9 l) high impact plastic containers with wide mouth, screw on cap and carrying handle. EZ-MUD polymer is also packaged in one gallon, screw top plastic containers, four (4) one gallon containers per carton.

Environmental Information:

BENSEAL/EZ-MUD Slurry contains no contaminants. It is non-toxic and does not ferment or spcil. BENSEAL/EZ-MUD Slurry has been field and laboratory tested and used successfully in the suggested applications without negative results. Environmental safety and transportation data sheets are available.

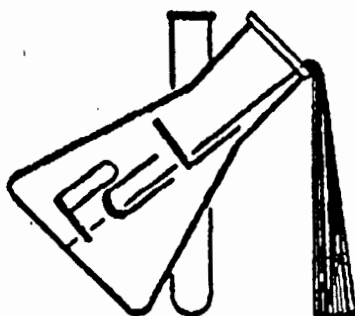
Availability:

BENSEAL sealing and plugging agent and EZ-MUD polymer may be purchased through NL Baroid Service Centers or from QUIK-GEL® retailers.



APPENDIX C

Drilling Fluids/Cuttings Analysis and Disposal Manifests



PATCHEM LABORATORIES

2205 First St. #108 • Simi Valley, CA 93065 • (805) 581-9006

Customer: Martin Industrial Pumping
P.O. Box 1128
Canyon Country, CA 91351

Attention: Mr. Harry Christensen

Sample Date: 6-30-89

Report Date: 6-30-89

Sample I.D.: 8906-2626

Subject: Oil Drilling Mud


Method: Sample was analyzed per Method 8010 of EPA Test
Methods for Evaluating Solid Waste, Physical/
Chemical Methods (SW-846).

Results:

<u>PARAMETER</u>	<u>DETECTION LIMIT</u>	<u>ANALYSIS</u>
1,1,1 Trichloroethane	0.02 mg/L	0.24 mg/L
1,1,2,2 Tetrachloroethylene	0.02 mg/L	0.05 mg/L

Comments: Compounds detectable by Method 8010, but not listed, would have been reported if present at or above the detection limit.

Respectfully Submitted,


Pat Brueckner
Chemist

PB/rt.



INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
No 3520

Billing Name BERNITE
Address 22116 GALE ROAD
City CHUGAS IN Zip 9
Service Name _____
Address _____
City _____ Zip _____

EPA I.D. No.
CAD000628636

Date 6-30-87

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #

110010
2423 1877

Time Out _____
Time In _____
Elapsed Time _____

By _____

Description	Price	Total
<u>Pump and clean 2 10 YRDS</u>		
<u>Haul To Landfill</u>		

Other Information _____

Customer's P.O. Number

Authorized by

Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.

No 1817

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME ERTITE DRILLING CO. A EPA I.D. NO. CAD000628636

ADDRESS 2210 W. 10000 RD.

CITY, STATE, ZIP 1817 CA 91350 PHONE NO. (805) 251-3737

CONTAINERS: No. one VOLUME 40 BBL'S WEIGHT 2R

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION DRILLING MUD GENERATING PROCESS WATER WELL DRILLING

COMPONENTS OF WASTE		PPM	%	COMPONENTS OF WASTE		PPM	%
1.	<u>111 TCE</u>	<u>0.24</u>		5.			
2.	<u>1122 TCE</u>	<u>0.05</u>		6.			
3.				7.			
4.				8.			

PROPERTIES: pH 8 ☐ SOLID ☐ LIQUID ☒ SLUDGE ☒ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS: Calve's

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

TIM ERICKER Bier 6/30/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA I.D. NO. CAD000628636

ADDRESS P.O. BOX 1128 SERVICE ORDER NO. _____

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PICK UP DATE 6-30-89

PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. #1 TRUCK LARRY RAMIREZ Larry Ramirez
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME 21215 JEFFERSON AVE EPA I.D. NO. CAD0900000000000000

ADDRESS 575 RT. 1 X4 DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

CITY, STATE, ZIP MCKINSTRICK CA 91251

PHONE NO. (805) 762-7606

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF	NONE

DISCREPANCY

No 2424

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME BERNITE DIV. OF WHITTAKER EPA I.D. NO. CAD0064573104

ADDRESS 22116 W. SCHOENHARDT RD.

CITY, STATE, ZIP SHUGUS CA. 91350 PHONE NO. (805) 259-2241

CONTAINERS: No. one VOLUME 30 BBLs WEIGHT _____

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER _____

WASTE DESCRIPTION ☒ DRILLING MUD GENERATING PROCESS Drilling

COMPONENTS OF WASTE PPM % COMPONENTS OF WASTE PPM %

1. 111 TCE 0.21 5. _____

2. 1122 TCE 0.05 6. _____

3. _____ 7. _____

4. _____ 8. _____

PROPERTIES: pH 8 ☐ SOLID ☒ LIQUID ☒ SLUDGE ☐ SLURRY ☐ OTHER _____

HANDLING INSTRUCTIONS: Close

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

Larry Ramirez TYPED OR PRINTED FULL NAME & SIGNATURE 6-30-88 DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA I.D. NO. CAD000628636

ADDRESS P.O. BOX 1128 SERVICE ORDER NO. _____

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PICK UP DATE 6-30-89

PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. # 2 Tank TYPED OR PRINTED FULL NAME & SIGNATURE Larry Ramirez DATE 6-30-88

TSD FACILITY

NAME Liquid waste 1116-7 EPA I.D. NO. CAD0018061316834

ADDRESS Star Rest. Box 4 DISPOSAL METHOD ☐ LANDFILL ☐ OTHER _____

CITY, STATE, ZIP Hickitrick CA. 93251

PHONE NO. (805) 762-7606

_____ TYPED OR PRINTED FULL NAME & SIGNATURE _____ DATE _____

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF NONE	DISCREPANCY



P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
№ 3519

EPA I.D. No.
CAD000628636

Date 6-30-71

WASTE HAULER
REGISTRATION NO. 335

Time Out _____
 → Time In _____
 Elapsed
 Time _____

MANIFEST #
1001
2424

By

Description	Price	Total
Pump shucker 1' x 1 1/2' x 20' BRLS		
Other Information		

Other Information

Customer's P.O. Number _____

Authorized by _____

Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.



INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
No 3459

Billing Name WILLIAMS CO. BERMITE

Address 82116 SLEAD

City LAUGLE CA. Zip _____

Service Name _____

Address _____

City _____ Zip _____

EPA I.D. No.
CAD000628636

Date 6-29-89

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #

Time Out _____
Time In _____
Elapsed Time _____

Description	Price	Total
<u>DELIVER (2) 10 YARD ROLL OFF BOXES</u>		
<u>FOR DRILLING MUD</u>		
Other Information <u>Box # 10371</u> <u>10381</u>		

Customer's P.O. Number

Authorized by

Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

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INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
No 3662

Billing Name BRENNITE
Address 22116 S KERR CYN RD
City SAVANA Zip 91750
Service Name _____
Address _____
City _____ Zip _____

EPA I.D. No. _____
CAD000628636

Date 7-6-85

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #
2426

Time Out _____
Time In _____
Elapsed Time _____

By DS

Description	Price	Total
<u>PUMP ROLL OFF BOYS AND TRANSPORT</u>		
<u>to LIQUID WASTE</u>		

Other Information _____

Customer's P.O. Number

TIM BRUCE
Authorized by

[Signature]
Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

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INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.

No 2426

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME BERMITC EPA I.D. NO. 110494AT111

ADDRESS 22116 Sole and CYN RD. PHONE NO. () () ()

CITY, STATE, ZIP SANGLIS, PA. 91350

CONTAINERS: No 1 VOLUME 2500 G WEIGHT

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION GENERATING PROCESS

COMPONENTS OF WASTE			COMPONENTS OF WASTE		
	PPM	%		PPM	%
1. <u>Water</u>	<u>75</u>	<u>90</u>	5. <u> </u>	<u> </u>	<u> </u>
2. <u>Mud</u>	<u>25</u>	<u>10</u>	6. <u> </u>	<u> </u>	<u> </u>
3. <u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>
4. <u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>

PROPERTIES: pH ☐ SOLID ☒ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS: gloves, goggles

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

TIM CRICKER 7/6/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA I.D. NO. CAD000628636

ADDRESS P.O. BOX 1128 SERVICE ORDER NO.

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PICK UP DATE 7-6-89

PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. 9 T-1 7-6-89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME Liquid Waste Management EPA I.D. NO. CAD09189934834

ADDRESS ETON RD. BOX 1 DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

CITY, STATE, ZIP McKITTRELL PA 93251

PHONE NO. (805) 782-7606

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF	NONE

DISCREPANCY



INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
Nº 3603

Billing Name WILKINSON W.P. BERMITE
Address 82110 SOLEDAD RD
City SAN GUS Zip CA 91350
Service Name _____
Address _____
City _____ Zip _____

EPA I.D. No.
CAD000628636

Date 7-10-89

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #

Time Out _____
Time In _____
Elapsed Time _____

By [Signature]

Description	Price	Total
<u>P/L AND HILL 10 YARD RILL OFF BOX</u>		
<u>WHERE DIRECTED.</u>		

Other Information _____

Customer's P.O. Number

Authorized by

Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.



P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE

3113

Billing Name 1

Address _____

City _____ Zip _____

Service Name BERMITE

Address _____

City _____ Zip _____

EPA I.D. No.
CAD000628636

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #

2333

Date 7-11-89

Time Out _____

Time In _____

Elapsed _____

Time _____

By CARL

Description	Price	Total
<u>PUMP OUT 3 ROLL OFF BOXES AND TRANSPORT</u>		
<u>TO LIQUID WASTE FOR DISPOSAL</u>		
Other Information _____		

Customer's P.O. Number

Authorized by

Howard W. Smith
Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.



P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
No 3492

Billing Name _____
Address _____
City _____ Zip _____
Service Name PERMITE
Address _____
City _____ Zip _____

EPA I.D. No.
CAD000628636

Date 7-11-89

WASTE HAULER
REGISTRATION NO. 335

MANIFEST #

Time Out _____
Time In _____
Elapsed Time _____

2332

By DAVE

Description	Price	Total
<u>LOAD 2 10 YARD PUMPS AND TRANSPORT TO</u>		
<u>LIQUID WASTE FOR DISPOSAL</u>		
Other Information _____		

Customer's P.O. Number

Authorized by

[Signature]
Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.



INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE
No 3493

Billing Name _____

Address _____

City _____ Zip _____

Service Name PERMITE

Address _____

City SAN GUSTO Zip _____

EPA I.D. No.
CAD000628636

Date 7/11/89

WASTE HAULER
REGISTRATION NO. 335

Time Out _____

Time In _____

MANIFEST #

Elapsed Time _____

Time _____

By [Signature]

Description	Price	Total
STANDBY + PUMP GOOSENECK TANK		
+ HAUL TO LWM. FOR DISP		

Other Information _____

Customer's P.O. Number _____

Authorized by _____

Customer's Signature _____

Total Charges _____

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.

No 2332

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME BERMITE ADDRESS SOLEDAD CYN RD CITY, STATE, ZIP SAUGUS 91352 PHONE NO. _____

CONTAINERS: No. 02 VOLUME 14 Y WEIGHT HEAVY

TYPE: ☐ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☒ OTHER ROLL OFF

WASTE DESCRIPTION DRINKING MUD GENERATING PROCESS TEST WELL

COMPONENTS OF WASTE			COMPONENTS OF WASTE		
	PPM	%		PPM	%
1. <u>MUD</u>	<u>95</u>	<u>9</u>	5. _____	_____	_____
2. <u>WATER</u>	<u>5</u>	<u>0</u>	6. _____	_____	_____
3. _____	_____	_____	7. _____	_____	_____
4. _____	_____	_____	8. _____	_____	_____

PROPERTIES: pH 7 ☒ SOLID ☐ LIQUID ☐ SLUDGE ☒ SLURRY ☐ OTHER _____

HANDLING INSTRUCTIONS: _____

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

Gregory W. Smith Gregory W. Smith 7/11/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. ADDRESS P.O. BOX 1128 CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. 11/11A SERVICE ORDER NO. 3492 PICK UP DATE 7/11/89

DAVID SCHWARTZ 7-11-89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME LIQUID WASTE MGMT ADDRESS HWY 33 + 5B CITY, STATE, ZIP MCKITTRICK, CA PHONE NO. () _____

DISPOSAL METHOD ☐ LANDFILL ☐ OTHER _____

_____ DATE _____

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF NONE	DISCREPANCY

No 2333

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME PERMITE ADDRESS 26000 CYN RD CITY, STATE, ZIP SAUGUS, CA 91352 PHONE NO.

CONTAINERS: No. 01 VOLUME 50 HHL WEIGHT

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION DRILLING MUD GENERATING PROCESS TEST WELL

COMPONENTS OF WASTE			COMPONENTS OF WASTE		
	PPM	%		PPM	%
1. <u>MUD</u>	<u>10</u>	<u>1%</u>	5. <u> </u>	<u> </u>	<u> </u>
2. <u>WATER</u>	<u>90</u>	<u>9%</u>	6. <u> </u>	<u> </u>	<u> </u>
3. <u> </u>	<u> </u>	<u> </u>	7. <u> </u>	<u> </u>	<u> </u>
4. <u> </u>	<u> </u>	<u> </u>	8. <u> </u>	<u> </u>	<u> </u>

PROPERTIES: pH 7 ☐ SOLID ☒ LIQUID ☐ SLUDGE ☒ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS:

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

GEORGE W. SMITH George W. Smith 7/11/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. ADDRESS P.O. BOX 1128 CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. 10/T-3 SERVICE ORDER NO. 3113 PICK UP DATE 7/11/89

CARL POPP Carl Popp 7/11/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

EPA I.D. NO. CAD000628636

TSD FACILITY

NAME LIQUID WASTE MGMT ADDRESS Hwy 33 + 58 CITY, STATE, ZIP MCKITTRICK, CA PHONE NO. ()

DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF NONE	

DISCREPANCY

No 2334

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME BERMITE ADDRESS SOLE OAD CYN RD CITY, STATE, ZIP SAUGUS PHONE NO. ()

CONTAINERS: No. 01 VOLUME 40 BBL WEIGHT

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION DRILLING MUD GENERATING PROCESS TEST WELL

COMPONENTS OF WASTE			PPM	%	COMPONENTS OF WASTE			PPM	%
1.	<u>MUD</u>		<u>10</u>	<u>%</u>	5.				
2.	<u>WATER</u>		<u>90</u>	<u>%</u>	6.				
3.					7.				
4.					8.				

PROPERTIES: pH 7 ☐ SOLID ☒ LIQUID ☐ SLUDGE ☒ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS:

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

George W. Smith TYPED OR PRINTED FULL NAME & SIGNATURE DATE 7/11/89

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. ADDRESS P.O. BOX 1128 CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. 10/T-2 EPA I.D. NO. CAD000628636 SERVICE ORDER NO. 3495 PICK UP DATE 7/11/89

CARL POPP TYPED OR PRINTED FULL NAME & SIGNATURE DATE 7/11/89

TSD FACILITY

NAME LIQUID WASTE MOUNT ADDRESS HWY 33+53 CITY, STATE, ZIP MCKITTERICK, CA PHONE NO. ()

DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

DISCREPANCY

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/Q		RT/CD	HWDF NONE	



P.O. Box 1128, Canyon Country, CA 91351
Telephone (805) 251-3737

INVOICE

No 3737

Billing Name _____

Address _____

City _____ Zip _____

Service Name BERMITE

Address _____

City SAUGUS, CA Zip _____

EPA I.D. No.
CAD000628636

Date 7/14/84

WASTE HAULER
REGISTRATION NO. 335

Time Out _____

Time In _____

Elapsed Time _____

MANIFEST #

N/H # 2702

By CF

Description

Price

Total

<u>2/0 10 YRD 2/0 BOX OF AWD &</u>		
<u>TRANSPORT TO LWM FOR DISPOSAL</u>		

Other Information * WASHOUT

Customer's P.O. Number

TIM FRICKER

Authorized by

[Signature]

Customer's Signature

Total Charges

NET 15 DAYS

TERMS AND CONDITIONS

WARRANTIES: Customer expressly warrants that the information provided on the Uniform Hazardous Waste Manifest is complete and accurate.

INDEMNITY: Customer shall indemnify MARTIN INDUSTRIAL PUMPING, INC. against all losses on account of claims of injury to persons or damage to property, including attorney's fees, which may result in any way due to Customer providing incomplete or inaccurate information regarding materials being transported and/or information provided on the Uniform Hazardous Waste Manifest. Said Customer shall further be responsible for all costs incurred by MARTIN INDUSTRIAL PUMPING, INC. due to incomplete or inaccurate information provided which results in the disposal site's refusal to accept the waste for disposal. Customer assumes all liability for overweight fines levied by the State.

ATTORNEY'S FEES AND COSTS: If Customer fails to pay the total charges pursuant to the invoice or the additional terms set forth therein, and it becomes necessary to obtain the services of an attorney to collect the amount owed, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to attorney's fees and costs in collecting said amount owed.

INTEREST ON OBLIGATION: If Customer fails to make total payment within fifteen (15) days from the date of the invoice, then MARTIN INDUSTRIAL PUMPING, INC. shall be entitled to interest at the rate of 1.5% per month on the amount owed until paid in full.

No 2302

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR	NAME <u>BERNITE</u>		EPA I.D. NO. <u>EXEMPT</u>												
	ADDRESS <u>GRAND PIN RD</u>														
	CITY, STATE, ZIP <u>SAN JOSE CA 91351</u>		PHONE NO. <u>(805) 251-2741</u>												
	CONTAINERS: No. <u>1</u>		VOLUME <u>6 YRDS</u> WEIGHT _____												
	TYPE: <input type="checkbox"/> TANK TRUCK <input type="checkbox"/> DUMP TRUCK <input type="checkbox"/> DRUMS <input type="checkbox"/> CARTONS <input checked="" type="checkbox"/> OTHER <u>ROLL OFF</u>														
	WASTE DESCRIPTION <u>DRILLING MUD</u>		GENERATING PROCESS <u>TEST WELL</u>												
	COMPONENTS OF WASTE		COMPONENTS OF WASTE												
	PPM %		PPM %												
	1. <u>MUD</u>	<u>95 %</u>	5. _____	_____											
	2. <u>WATER</u>	<u>5 %</u>	6. _____	_____											
	3. _____	_____	7. _____	_____											
	4. _____	_____	8. _____	_____											
	PROPERTIES: pH <u>7</u> <input checked="" type="checkbox"/> SOLID <input type="checkbox"/> LIQUID <input checked="" type="checkbox"/> SLUDGE <input checked="" type="checkbox"/> SLURRY <input type="checkbox"/> OTHER _____														
	HANDLING INSTRUCTIONS: _____														
	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS. </div>														
	<u>TIM ERKKER</u> TYPED OR PRINTED FULL NAME & SIGNATURE		<u>7/14/89</u> DATE												
TRANSPORTER	NAME <u>MARTIN IND. PUMPING, INC.</u>		EPA I.D. NO. <u>CAD000628636</u>												
	ADDRESS <u>P.O. BOX 1128</u>		SERVICE ORDER NO. <u>5737</u>												
	CITY, STATE, ZIP <u>CANYON COUNTRY, CA 91351</u>		PICK UP DATE <u>7/14/89</u>												
	PHONE NO. <u>(805) 251-3737</u>		DATE <u>7/14/89</u>												
	TRUCK, UNIT, I.D. NO. <u>10/10A/104</u>		<u>CALL POPP</u> TYPED OR PRINTED FULL NAME & SIGNATURE												
TSD FACILITY	NAME <u>LIQUID WASTE MGMT</u>		EPA I.D. NO. _____												
	ADDRESS <u>HWY 33 + 58</u>		DISPOSAL METHOD												
	CITY, STATE, ZIP <u>MCKITTRICK, CA</u>		<input type="checkbox"/> LANDFILL <input type="checkbox"/> OTHER _____												
	PHONE NO. () _____		_____												
	TYPED OR PRINTED FULL NAME & SIGNATURE _____		DATE _____												
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>GEN</td> <td rowspan="3">OLD/NEW</td> <td>L</td> <td>A</td> <td rowspan="3">TONS</td> </tr> <tr> <td>TRANS</td> <td>S</td> <td>B</td> </tr> <tr> <td>C/O</td> <td>RT/CD</td> <td>HWDF NONE</td> </tr> </table>	GEN	OLD/NEW	L	A	TONS	TRANS	S	B	C/O	RT/CD	HWDF NONE	DISCREPANCY		
GEN	OLD/NEW	L		A	TONS										
TRANS		S		B											
C/O		RT/CD	HWDF NONE												

LIQUID WASTE MANAGEMENT, INC.

STAR RTE. BOX 4, CORNER HWY. 33 AND HWY. 58
MCKITTRICK, CA 93251
(805) 762-7607

30799

Lease _____

Scale Ticket #

Well # _____

Ph # 60201347

Approved Disposal Site
MCKITTRICK

Operator
LIQUID WASTE MANAGEMENT, INC.

LIQUID WASTE DISCHARGE REPORT**A. Liquid Waste Source:**Company Berminite

Address _____

Description: ☐ Soil ☐ Brine ☐ Drilling Mud ☒ Other Water/Sol

B. Licensed Waste HaulerCompany Master And PumpingAddress 9.

Truck # _____

C. Delivery Date:Date: 8-7-89**D. Invoice:**X Hauler

Waste Source _____

Quantity 2.22 Tons15 bbls.

Cost Per Ton _____

Wash Out: _____ @ \$ _____ ea.

Total Cost _____

"I certify that the above described waste was hauled to this approved disposal site and was an acceptable waste as established by Order No. 72-256 of the California Regional Water Quality Control Board."

Matthew K. etc
Signature of Disposal Site Operator

OPERATOR

[Signature]
Signature of Licensed Hauler

No 2447

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME Gen. Ind. Pumping, Inc. EPA I.D. NO. 11E4-111111

ADDRESS 2214 S. 1st St. P.O. Box 1128

CITY, STATE, ZIP SAN JOSE, CA. 95135 PHONE NO. (855) 259-2500

CONTAINERS: No 1 VOLUME 600 G WEIGHT

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION GENERATING PROCESS

COMPONENTS OF WASTE			PPM	COMPONENTS OF WASTE			PPM
1	<u>Water</u>	<u>75</u>	<u>0%</u>	5	<u></u>	<u></u>	<u></u>
2	<u>Oil</u>	<u>25</u>	<u>0%</u>	6	<u></u>	<u></u>	<u></u>
3	<u></u>	<u></u>	<u></u>	7	<u></u>	<u></u>	<u></u>
4	<u></u>	<u></u>	<u></u>	8	<u></u>	<u></u>	<u></u>

PROPERTIES: pH ☐ SOLID ☒ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS: 7/10/89 - 7/10/89

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

TYPED OR PRINTED FULL NAME & SIGNATURE

DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA I.D. NO. CAD000628636

ADDRESS P.O. BOX 1128 SERVICE ORDER NO.

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 PICK UP DATE 7-10-89

PHONE NO. (805) 251-3737

TRUCK, UNIT, I.D. NO. 7 T-7 TYPED OR PRINTED FULL NAME & SIGNATURE James A. Smith DATE 7-10-89

TSD FACILITY

NAME Gen. Ind. Pumping, Inc. EPA I.D. NO. 11E4-111111

ADDRESS 2214 S. 1st St. P.O. Box 1128 DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

CITY, STATE, ZIP SAN JOSE, CA. 95135

PHONE NO. (855) 259-2500

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/O		RT/CD	HWDF NONE	

DISCREPANCY

No 2447

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME Bea m i t t EPA I.D. NO. 115161001

ADDRESS 22116 Soledad cty. rd

CITY, STATE, ZIP Saugus, CA. 91351 PHONE NO. 805 259-2244

CONTAINERS: No 1 VOLUME 600 G WEIGHT _____

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER _____

WASTE DESCRIPTION			GENERATING PROCESS		
COMPONENTS OF WASTE	PPM	%	COMPONENTS OF WASTE	PPM	%
1 <u>Water</u>	<u>75</u>	<u>0%</u>	5 _____	_____	_____
2 <u>Oil</u>	<u>25</u>	<u>0%</u>	6 _____	_____	_____
3 _____	_____	_____	7 _____	_____	_____
4 _____	_____	_____	8 _____	_____	_____

PROPERTIES: pH _____ ☒ SOLID ☒ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER _____

HANDLING INSTRUCTIONS gloves goggles

THE GENERATOR CERTIFIES THAT
 THE WASTE AS DESCRIBED IS 100%
 NON-HAZARDOUS.

TYPED OR PRINTED FULL NAME & SIGNATURE

DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA I.D. NO. CAD000628636

ADDRESS P.O. BOX 1128

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 SERVICE ORDER NO. _____

PHONE NO. (805) 251-3737 PICK UP DATE 8-9-89

TRUCK, UNIT, I.D. NO. 9 T-2 James A. Smith 8-9-89

TYPED OR PRINTED FULL NAME & SIGNATURE _____ DATE _____

TSD FACILITY

NAME Liquid Waste Management EPA I.D. NO. 3449132613161814

ADDRESS 7100 St. Box 4 DISPOSAL METHOD ☐ LANDFILL ☒ OTHER Surface

CITY, STATE, ZIP McKittrick, CA. 93251 Improvement

PHONE NO. 805 262-7606 MARTHA Dale 8-9-89

TYPED OR PRINTED FULL NAME & SIGNATURE _____ DATE _____

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	<u>2.22</u>
C/O		RT/CD	HWDF	NONE

DISCREPANCY

Ph. 6.0

MARTIN

INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

JOB WORK ORDER

MANIFEST # 2467

JOB DATE: 8-7-84

DATE: 8-8-89

MATERIALS & EQUIPMENT

JOB NAME Bermuda	TRUCK # 9	VACUUM	ROLL OFF
JOB LOCATION 2216 Solenad	TRAILER # T-2	HOTSIE	MRS.
CITY Savannah	DOT DRUMS	ABSORBANT	LINERS
PHONE 908-259-2241	LABOR	MEN	HOURS
EPA NUMBER:	TAX #	ADDITIONAL MATERIALS:	
DOT DESCRIPTION:			
HAZARD CLASS:			
ID NUMBER:			
WASTE CODES:			
ADDITIONAL DESCRIPTION:	ANALYSIS:	CHARGE:	
	PROFILING FEE:	CHARGE:	
	DISPOSAL SITE: LWM	DIRECT BILLING:	
DESCRIPTION OF WORK:	COMMENTS:		
Pump 6 Drums of Soil ADD WATER AND PUMP AND TRANSPORT TO LWM	PUMP SOILS OF DIRT & WATER AND TRANSPORT TO LIQUID WASTE		
* 90889-46	SUB HAULER:		
		COD AMOUNT \$	
		JOB AMOUNT \$	

WORK ORDERED BY:	P.O. #:	ORDER TAKEN BY:	DRIVER	CUSTOMER SIGNATURE:
J.R.		L.H.	[Signature]	[Signature]

MARTIN

INDUSTRIAL PUMPING INC.
WASTE MANAGEMENT

JOB WORK ORDER

MANIFEST # 2431

DATE: 7-26-89

MATERIALS & EQUIPMENT

JOB DATE: 7-28-89

JOB NAME: <u>Bearmity</u>		TRUCK # <u>8</u>	<u>VACUUM</u>	ROLL OFF
JOB LOCATION: <u>22116 W Solano Ct</u>		TRAILER # <u>T-4</u>	HOTSIE	HRS.
CITY: <u>Sanger Ca 91350</u>		DOT DRUMS	ABSORBANT	LINERS
PHONE	CONTACT	LABOR	MEN	HOURS
EPA NUMBER: TAX #		ADDITIONAL MATERIALS:		
DOT DESCRIPTION:				
HAZARD CLASS: <u>Non</u>				
ID NUMBER:				
WASTE CODES: <u>HAZ</u>				
ADDITIONAL DESCRIPTION:		ANALYSIS: CHARGE:		
		PROFILING FEE: CHARGE:		
		DISPOSAL SITE: DIRECT BILLING:		
DESCRIPTION OF WORK:		COMMENTS:		
		<u>ump remove tank transport</u>		
		<u>to liquid waste for disposal</u>		
<u>Pump 20 Drums off</u>				
<u>Drilling mud out</u>				
<u>Transport to LWM</u>				
<u>with ARCADIA</u>				
<u>7-28</u>		SUB HAULER:		
		COD AMOUNT \$		
		JOB AMOUNT \$		

WORK ORDERED BY:

P.O. #:

ORDER TAKEN BY:

DRIVER

CUSTOMER SIGNATURE

[Signature]

Nº 2431

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME BEHNITS EPA ID. NO. 11121414111

ADDRESS 22116 Soliman Cyn Ln.

CITY, STATE, ZIP SMITHS CA 91350 PHONE NO. (818) 259-2211

CONTAINERS: No 1 VOLUME 1000 G WEIGHT

TYPE: ☒ TANK TRUCK ☐ DUMP TRUCK ☐ DRUMS ☐ CARTONS ☐ OTHER

WASTE DESCRIPTION			GENERATING PROCESS		
COMPONENTS OF WASTE	PPM	%	COMPONENTS OF WASTE	PPM	%
1. <u>WATER</u>	<u>75</u>	<u>96</u>	5. <u></u>	<u></u>	<u></u>
2. <u>WATER</u>	<u>25</u>	<u>96</u>	6. <u></u>	<u></u>	<u></u>
3. <u></u>	<u></u>	<u></u>	7. <u></u>	<u></u>	<u></u>
4. <u></u>	<u></u>	<u></u>	8. <u></u>	<u></u>	<u></u>

PROPERTIES: pH ☒ SOLID ☐ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER

HANDLING INSTRUCTIONS gloves, goggles

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

TIM FRICKER T. Fricker 7/28/89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME MARTIN IND. PUMPING, INC. EPA ID. NO. CAD000628636

ADDRESS P.O. BOX 1128

CITY, STATE, ZIP CANYON COUNTRY, CA 91351 SERVICE ORDER NO.

PHONE NO. (805) 251-3737 PICK UP DATE 7-28-89

TRUCK, UNIT, ID NO. B T-4 Tim Fricker 7-28-89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME Liquid Waste Management EPA ID. NO. 11121414111

ADDRESS 22116 Soliman Cyn Ln. DISPOSAL METHOD ☐ LANDFILL ☐ OTHER

CITY, STATE, ZIP SMITHS CA 91350

PHONE NO. (818) 259-2211

Tim Fricker 7-28-89
TYPED OR PRINTED FULL NAME & SIGNATURE DATE

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
C/O		RT/CD	HWDF NONE	

DISCREPANCY

APPENDIX D

Aquifer Test Data Analysis

APPENDIX D

AQUIFER TEST DATA ANALYSIS

On June 7, 1989 an aquifer test was conducted by pumping well PW-1. Monitoring well MW-4, located approximately 76 feet away, was used as an observation well. The test was designed to evaluate hydraulic characteristics of the Saugus Aquifer. Beneath the Bermite facility the Saugus Aquifer is estimated to be 500 to 1,000 feet thick¹. A thickness of 500 feet was used in analysis of the pump test data.

Well PW-1 is completed approximately 50 feet into the Saugus Aquifer and, therefore, is considered as a partially penetrating well. The effects of partial penetration were considered during data analysis. Using the procedure outlined in Groundwater and Wells (Driscoll, 1986), specific capacity (and thus drawdown at a given discharge) can be corrected for partial penetration. Using the equation:

$$\frac{Q/S_p}{Q/S} = L \left[1 + 7 \frac{r}{2bL} \cos \frac{\pi L}{2} \right]$$

where: Q/S_p = Specific capacity for partial penetration
 Q/S = Maximum specific capacity (full penetration)
 L = Screen length as a fraction of aquifer thickness (decimal)
 b = Aquifer thickness (feet)
 r = Well radius (feet)

Water levels observed during the aquifer test were corrected to what they theoretically would have been had the well been fully penetrating. Inserting values for L , b , and r , the resulting ratio is:

$$\frac{Q/S_p}{Q/S} = 0.149$$

Thus, had the well been fully penetrating, drawdowns during the pump test would have been only about 15 percent of the drawdowns actually measured. A multiplier of 0.149 was therefore used to correct observed drawdowns. This same factor was used to correct drawdowns in the observation well (MW-4) also, since it is located in close proximity to pumped well.

The reason partial penetration results in larger drawdowns than full penetration is that water from below the screened interval must travel upward to reach the well, causing a vertical hydraulic gradient and a resulting lengthening of the flow paths. This increased flow path results in increased headloss, culminating in greater drawdown at the well.

¹United States Geological Survey, Water Resources Investigation in the Saugus-Newhall Area, Open File Report 72-320, February 10, 1972, Plate 2

Therefore, for the same discharge, greater drawdown is produced in a partially penetrating well than in a well fully penetrating the same aquifer.

Table D-1 gives corrected drawdowns both at the pumped well and at MW-4.

Three graphical analyses are presented. These include analysis of both drawdown and recovery in the observation well (MW-4) and an analysis of recovery in the pumped well (PW-1). All three analysis provide an estimate of transmissivity (T) (in gallons per day per foot or gpd/ft) while only the observation well could be used to estimate Storage Coefficient (S) (dimensionless). The results obtained were:

<u>Well</u>	<u>Data Type</u>	<u>T</u> <u>Transmissivity</u> <u>(gpd/ft)</u>	<u>S</u> <u>Storage</u> <u>Coefficient</u>
MW-4	Drawdown	25,000	0.0014
MW-4	Recovery	31,000	0.0001
PW-1	Recovery	24,000	N/A

Figures D-1 and D-2 present the graphical procedures used to evaluate T and S. Figure D-3 shows the pumped well recovery data prior to correction for partial penetration. The procedure used for calculating T and S during drawdown is the Theis procedure. T and S were calculated from the recovery data by a strait line method as described in "Groundwater and Wells", Driscoll 1986.

The calculated values of T fall within the range of values determined by the USGS¹ for the portion of the Saugus Aquifer underlying the 317 Area at the Bermite facility.

¹United States Geological Survey, Water Resources Investigation in the Saugus-Newhall Area, Open File Report 72-320, February 10, 1972, Plate 2

TABLE D4

BERMITE DIVISION - WHITTAKER CORPORATION
PUMP TEST DATA ANALYSIS

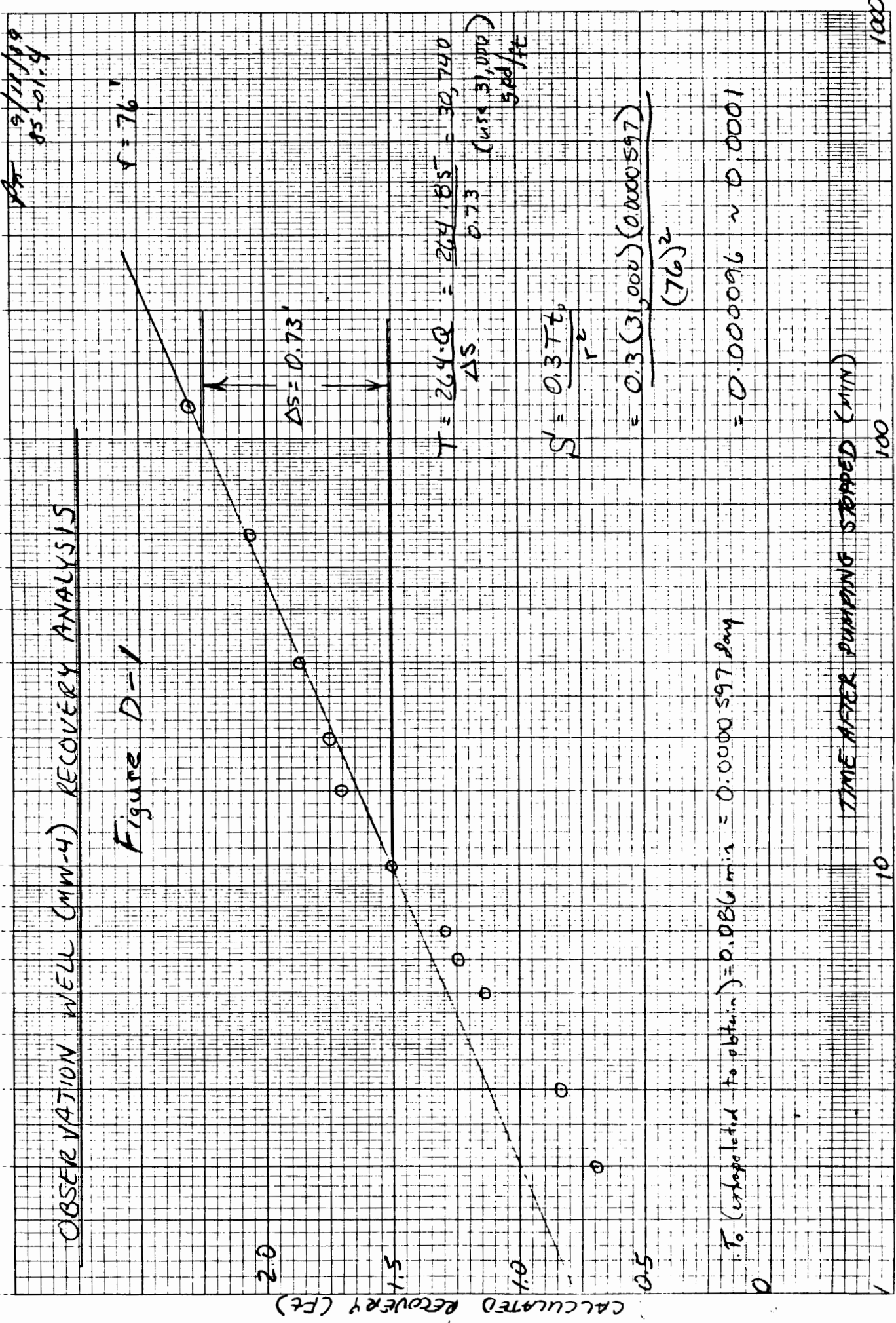
ELAPSED TIME (DAYS)	PUMPED WELL PW-1		R = 0.5'
	OBS. DD (FT)	CORR. DD (FT)	R*R/T (FT ² /DAY)
0	0.00	0.00	NA
0.0049	68.50	10.21	51.02
0.0083	70.25	10.47	30.12
0.0111	71.60	10.67	22.52
0.0139	72.70	10.83	17.99
0.0833	79.30	11.82	3.00
0.125	79.50	11.85	2.00
0.1667	80.20	11.95	1.50
0.2083	80.70	12.02	1.20

ELAPSED TIME		OBSERVATION WELL MW-4		R=	76 FT
(DAYS)	(MIN)	OBS. DD (FT)	CORR. DD (FT)	R*R/T (FT ² /DAY)	
0	0	0.00	0.00		
0.000694	1	3.70	0.56	8.32E+06	
0.001389	2	5.85	0.88	4.16E+06	
0.002083	3	6.45	0.97	2.77E+06	
0.002778	4	7.45	1.12	2.08E+06	
0.003472	5	7.90	1.19	1.66E+06	
0.004167	6	9.15	1.37	1.39E+06	
0.006944	10	10.15	1.52	8.32E+05	
0.010417	15	11.15	1.67	5.54E+05	
0.017361	25	12.70	1.91	3.33E+05	
0.022917	33	13.35	2.00	2.52E+05	
0.03125	45	13.95	2.09	1.85E+05	
0.041667	60	14.50	2.18	1.39E+05	
0.083333	120	15.90	2.39	6.93E+04	
0.125	180	16.60	2.49	4.62E+04	
0.166667	240	17.10	2.57	3.47E+04	
0.208333	300	17.35	2.60	2.77E+04	

NOTE: DRAWDOWNS CORRECTED FOR PARTIAL PENETRATION
BY MULTIPLYING BY 0.149

OBSERVATION WELL (MW-4) RECOVERY ANALYSIS

Figure D-1



PUMPED WELL (PW-1) RECOVERY ANALYSIS

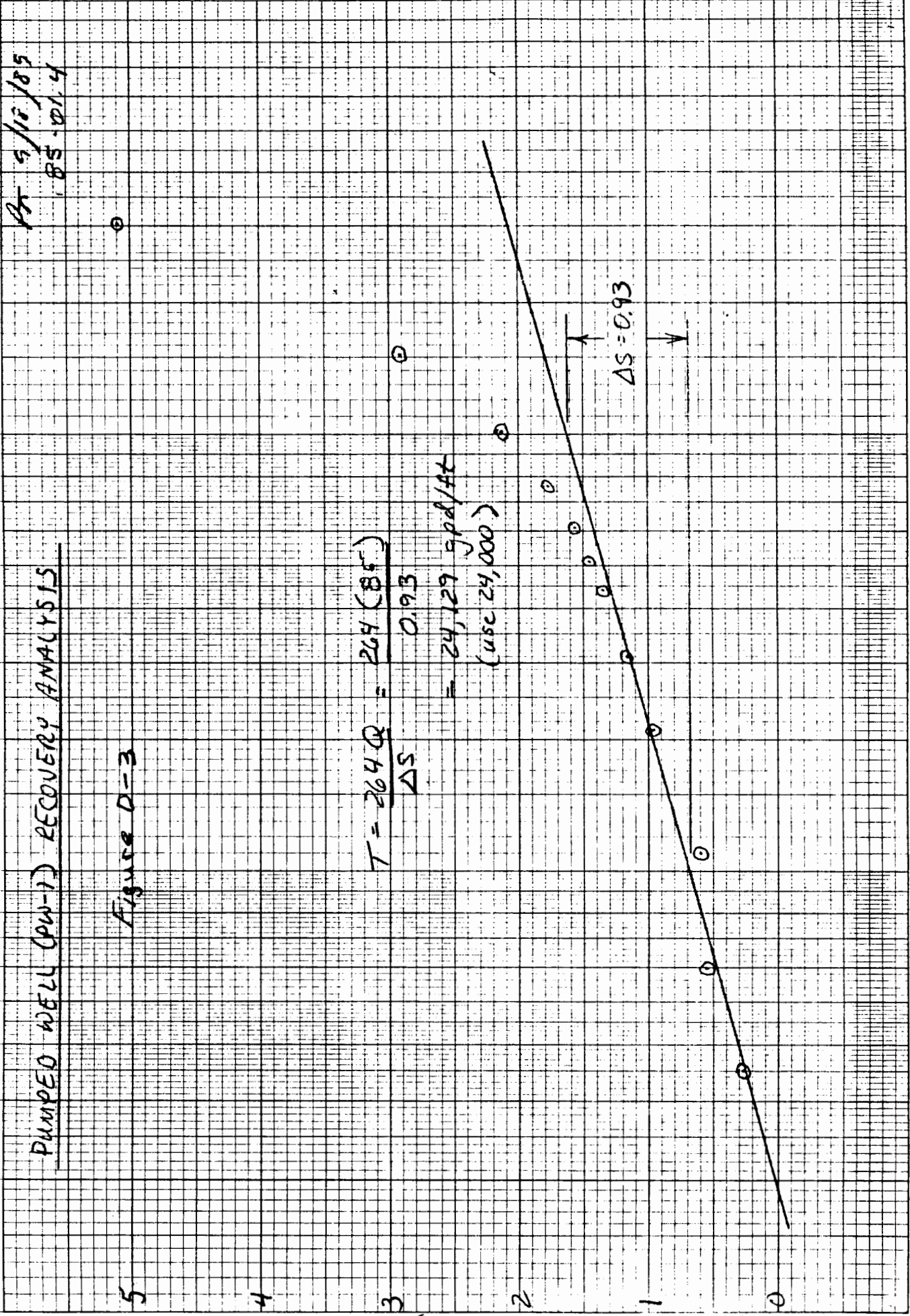
Figure D-3

$$T = \frac{264 Q}{\Delta S} = \frac{264 (85)}{0.93}$$

$$= 24,129 \text{ gpd/ft}$$

(use 24,000)

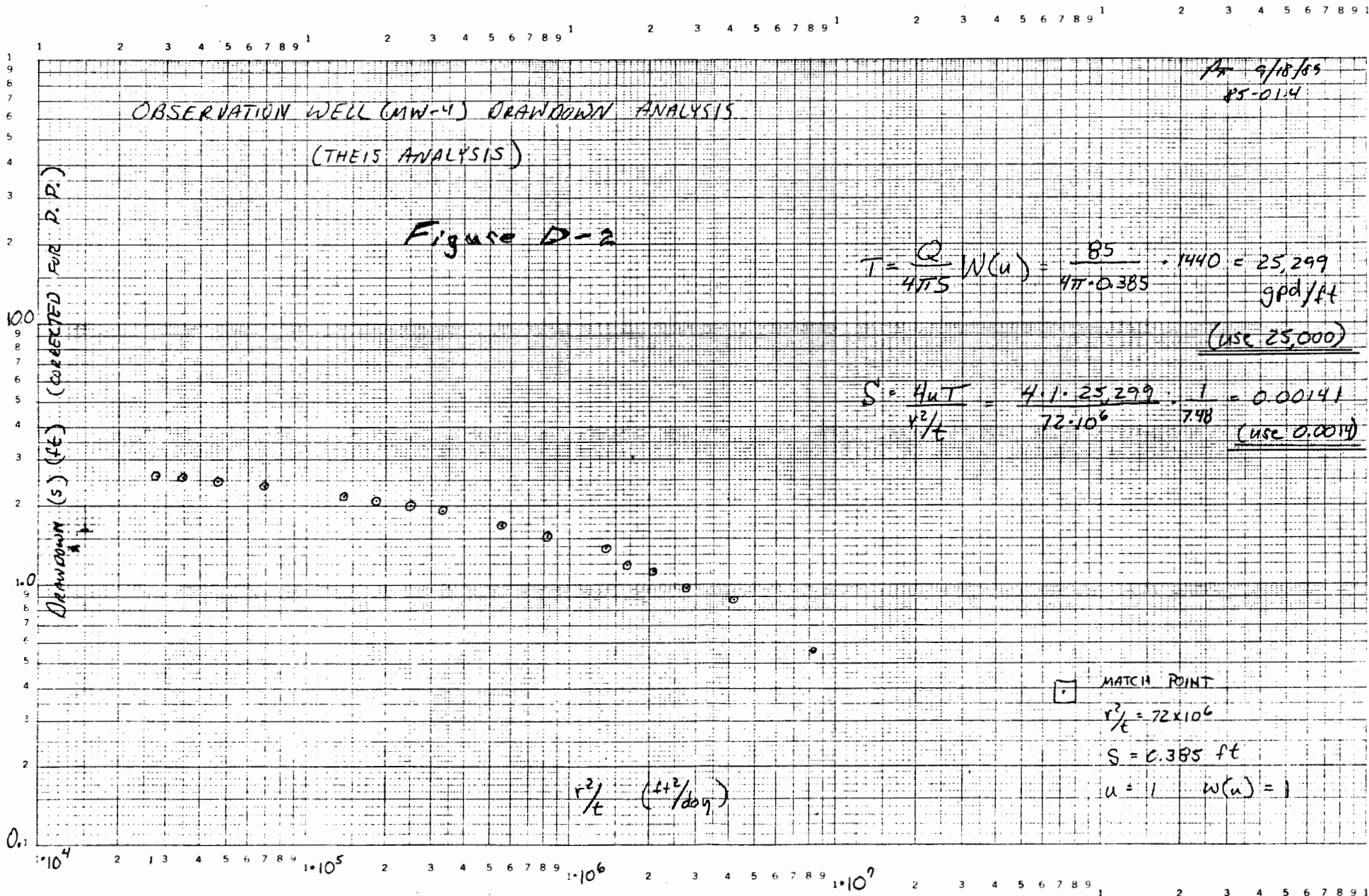
$\Delta S = 0.93$



Pr 9/10/85
85-014

47 7520

S

K-S
100
10
1
0.1

APPENDIX E

Well Logs, MW-5 and MW-6

WAI Job No.: 85-01.4Project: BERNIE

Consulting Engineers

Twelve Oaks Center
15500 Wayzata Blvd.
Wayzata, MN 55391Page 1 of 3Log of: MW-5

Vertical Scale: 1"=15'

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
	HARD CLAY, SOME SAND & GRAVEL	ALLUVIUM	GRAB	
50'	GRAVEL & COBBLES, SOME CLAY			RANDOM BOULDERS
100'				
150'				
	SAND & GRAVEL, CLAY CONTENT INCREASING IN SAMPLE	ALLUVIUM		

Drilling Company: <u>BEYLIK</u>	Date	Time	Pier Level	Casing Depth	Screen Interval	Note: Refer to the attached sheets for an explanation of terminology on this log.
Starting Date: <u>JULY 7, 1989</u>						
Completion Date: <u>JULY 10, 1989</u>						
Depth of Well: <u>663 FEET</u>						
Drilling Method: <u>MUD ROTARY</u>						
Surface Elevation: <u>1490.5</u>						
Top of Casing: <u>1493.38</u>						
Water Table Elevation: <u>N/A</u>						
Logged by: <u>GREGORY W. SMITH</u>						

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
100'				
200'	SMALL SHARP CUTTINGS, NOT ROUNDED, ABOUT THE SIZE OF COARSE SAND. NO CLAY. APPEARS TO BE CONSOLIDATED SAND (SANDSTONE)			SLOW, HARD DRILLING 200-220' WAS MOSTLY BOULDER
250'				
300'				
350'	SMALL SHARP CUTTING, HAS BEEN NO REAL CHANGE IN CUTTINGS EXCEPT FOR CLAY CONTENT.			STILL SLOW, HARD DRILLING.
400'				

WAI Job No.: BS-01.4Project: BERNIE

Consulting Engineers

Twelve Oaks Center
15500 Wayzata Blvd.
Wayzata, MN 55391Page 3 of 3Log of: MW-5

Vertical Scale: 1"=15'

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
450'				FREQUENT BOULDERS BETWEEN 440'-460'.
500'	STILL SMALL SHARP CUTTINGS THAT BEGAN AT ABOUT 200'. CLAY CONTENT BEGINNING TO INCREASE.	ALLUVIUM		BOULDERS ARE NO LONGER PRESENT.
550'	CLAY STILL INCREASING, STRINGERS OF CLAY APPEAR TO BE 3'-5' THICK. SHARP CUTTINGS (TYPICAL) A LOT OF CLAY AT ABOUT 550'-560' VERY LITTLE MATERIAL IN CUTTINGS, REMOVING TO SURFACE.			
600'				DRILLING MUD IS BEGINNING TO GET THICKER FROM NATURAL CLAYS.
650'	SANDY CLAY, HIGH CLAY CONTENT. MED. COARSE SAND FINE TO MED SAND IN SAMPLE,	ALLUVIUM		CLAYS ARE BEGINNING TO STICK TO BOREHOLE WALL. SOME SAND SHEDDING AROUND 620'. MUD BEGAN TO THIN WHILE DRILLING 640'-660' INTERVAL.
	END OF BORING AT 663'.			

WAI Job No.: 85-01.4Project: BERNITE

Consulting Engineers
 Twelve Oaks Center
 15500 Wayzata Blvd.
 Wayzata, MN 55391
Wenck Associates, Inc.

Page 1 of 4Log of: MW-6

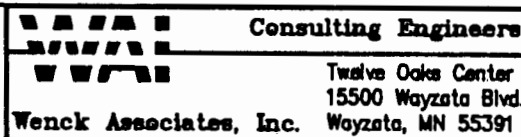
Vertical Scale: 1"=15'

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
50'	SAND & GRAVEL WITH CLAY	ALLUVIUM	GRAB	RANDON BOULDERS
100'	POORLY SORTED SAND WITH SOME GRAVEL, HIGH CLAY CONTENT SANDY CLAY	ALLUVIUM	GRAB	
150'				BOULDERS BETWEEN 170'-180'

Drilling Company: <u>BEYLIK DRILLING</u>	Date	Time	Prior Level	Casing Depth	Screen Interval	Note: Refer to the attached sheets for an explanation of terminology on this log.
Starting Date: <u>JUNE 23, 1989</u>						
Completion Date: <u>JUNE 29, 1989</u>						
Depth of Well: <u>697 FEET</u>						
Drilling Method: <u>MUD ROTARY</u>						
Surface Elevation: <u>1518.4</u>						
Top of Casing: <u>1521.14</u>						
Water Table Elevation: <u>N/A</u>						
Logged by: <u>GREGORY W. SMITH</u>						

WAI Job No.: 85-01.4

Project: BERNITE



Vertical Scale: 1"=15'

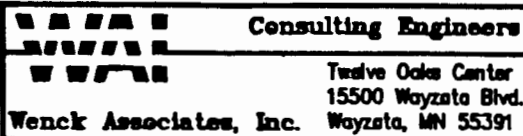
Page 2 of 4

Log of: MW-6

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
200'	SAND & GRAVEL, MINOR CLAY	ALLUVIUM	GRAB	Boulders between 230'-240'
250'				
300'				
350'	MED. TO COARSE SAND, HIGH CLAY CONTENT SANDY CLAY	ALLUVIUM		CLAY IS PROBABLY IN BEDS OR STRINGERS. MATERIAL IS MIXING COMING UP HOLE. DRILLING MUD IS THICKENING WITH NATURAL CLAYS
400'	GRAVEL		GRAB	
	SHARP ROCK CHIPS (CUTTINGS)			DRILLING ALOT OF BOULDERS HIGH CLAY BETWEEN 420'-440'

WAI Job No.: 85-01.4

Project: BERNITE



Page 3 of 4

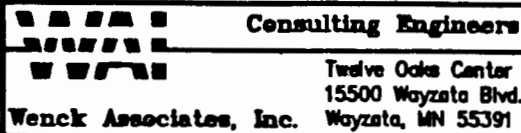
Log of: MW-6

Vertical Scale: 1"=15'

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
450'	MED TO COARSE SAND, CLAY IS VARIABLE BUT TYPICALLY QUITE HIGH.			RARE Boulders
500'				CLAY IS VERY HIGH AT TIMES
550'				Boulders between 575'-580'
600'	CLAY CONTENT IS INCREASING WITH DEPTH.			
650'				

WAI Job No.: 85-01.4

Project: BERNITE



Page 4 of 4

Log of: MW-6

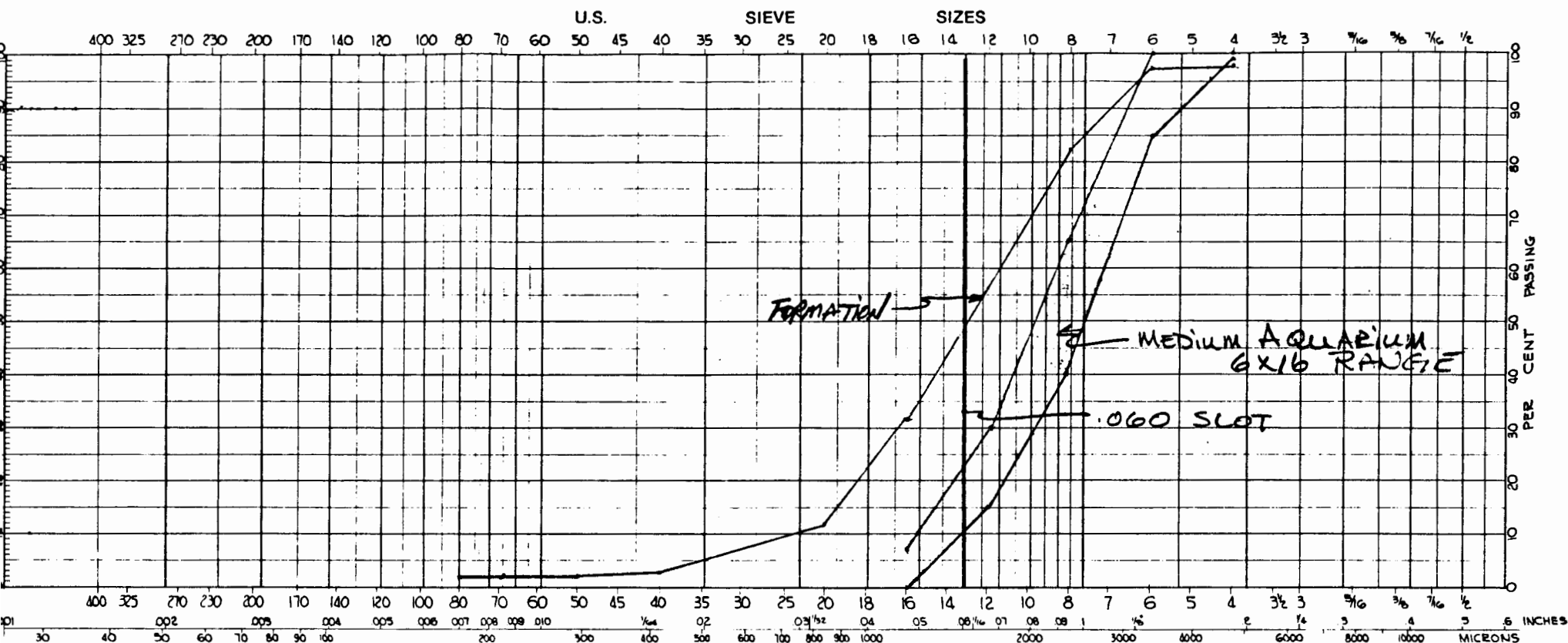
Vertical Scale: 1"=15'

Depth in Feet	Description and Classification	Geology	Sample type	Remarks
700'	End of Boring			SAMPLE WAS 100% ± CLAY AT 670' SOME SAND IN SAMPLE AT 680'. NORMAL CHANGE IN SAMPLES FROM 440' TO THE END OF BORING

APPENDIX F

Sieve Analysis of Soil Samples from MW-5 and MW-6 Borings

WATER WELL GRAVEL PACK AND FORMATION MECHANICAL GRADING ANALYSIS

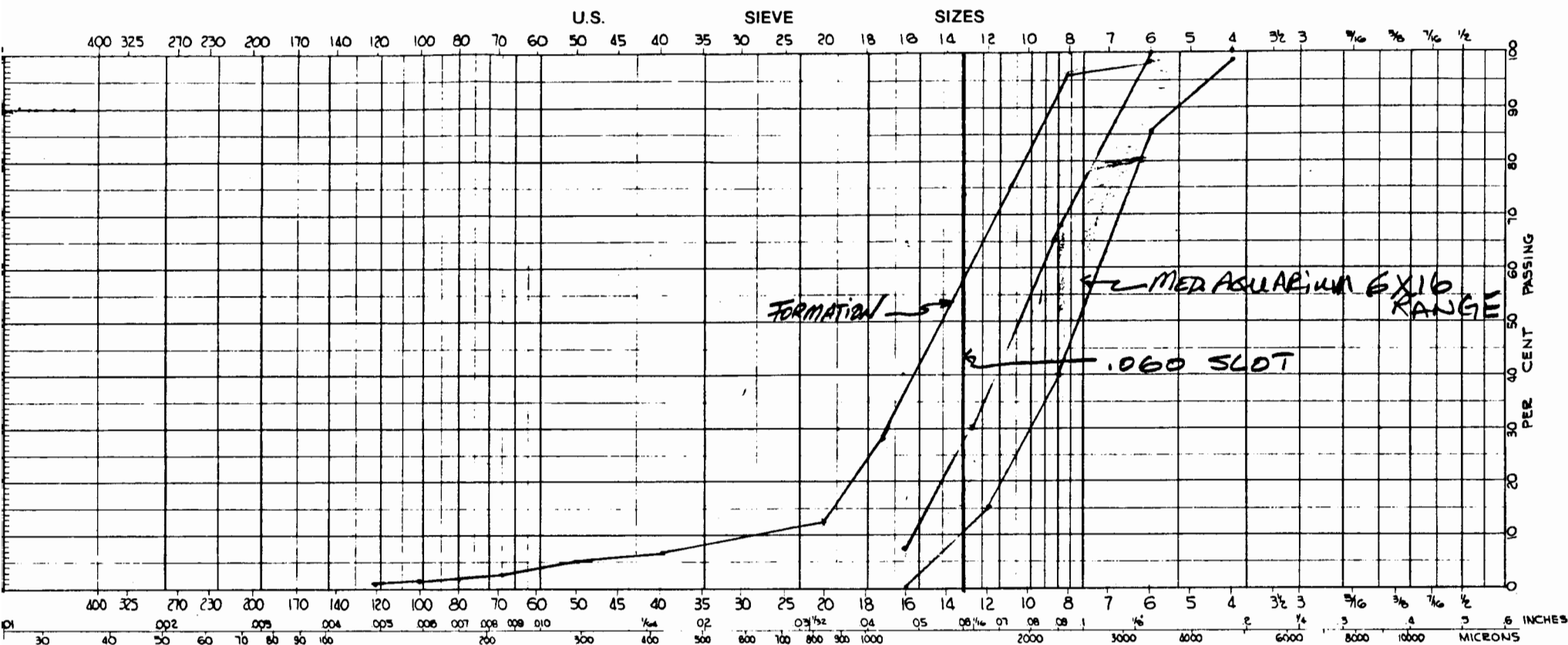


Formation Analysis		Gravel Pack Analysis	
Screen Size	% Passing	Screen Size	% Passing
4	98.0	4	99-100
6	97.5	6	85-100
8	82.6	8	40-65
16	31.6	12	15-30
20	11.6	16	0-7
40	2.8		
50	1.9		
70	1.6		
80	1.4		

Customer BERNITE
 Well Name & Number _____
 Well Location #5
 Gravel Name or Number MEDIUM AQUARIUM (8X16)
 Vendor _____
 Driller BEYLIK
 Date JULY 11, 1988


Roscoe Moss Company
 4360 Worth Street
 Los Angeles, California 90063
 P.O. Box 31064
 Los Angeles, California 90031
 213-263-4111

WATER WELL GRAVEL PACK AND FORMATION MECHANICAL GRADING ANALYSIS



Formation Analysis		Gravel Pack Analysis	
Screen Size	% Passing	Screen Size	% Passing
6	99	4	99-100
8	96	6	85-100
16	28	8	40-65
20	12	12	15-30
40	6	16	0-7
50	5		
70	3		
80	2		
100	2		
120	1		

Customer **BERMITE**

Well Name & Number

Well Location **#6**

Gravel Name or Number

Vendor

Driller **BEYLK**

Date



Roscoe Moss Company

4360 Worth Street
Los Angeles, California
90063

213-263-4111

P.O. Box 31064
Los Angeles, California
90031

APPENDIX G

**Laboratory Reports, Preliminary Sampling and
Analysis of Groundwater from Wells MW-5 and MW-6**

FGL ENVIRONMENTAL

ANALYTICAL CHEMISTS

August 11, 1989
Lab No. 19718-1

Bermite Division of Whittaker
22116 West Soledad Canyon Road
Saugus, California 91350

Sample Description: MW5
Sampled by: GAN
Date Sampled: August 2, 1989
Date Received: August 2, 1989

REPORT OF ANALYSIS

<u>Parameter</u>	<u>Test Results</u> <u>ug/l</u>	<u>Detection</u> <u>Limit</u> <u>ug/l</u>	<u>MCL</u> <u>ug/l</u>
TCE	ND	0.5	5.0
PCE	ND	0.5	4.0

ND = Not detected at or above the
concentration of the detection limit.

ug/l = ppb

Very truly yours,
FGL ENVIRONMENTAL



Uday Sathe, M.S.
Environmental Chemist

US/JP:mlh



J.G. Patel, M.S.
Environmental Chemist

FGL ENVIRONMENTAL

ANALYTICAL CHEMISTS

August 11, 1989
Lab No. 19718-2

Bermite Division of Whittaker
22116 West Soledad Canyon Road
Saugus, California 91350

Sample Description: MW6
Sampled by: GAN
Date Sampled: August 2, 1989
Date Received: August 2, 1989

REPORT OF ANALYSIS

<u>Parameter</u>	<u>Test Results</u> <u>ug/l</u>	<u>Detection</u> <u>Limit</u> <u>ug/l</u>	<u>MCL</u> <u>ug/l</u>
TCE	ND	0.5	5.0
PCE	ND	0.5	4.0

ND = Not detected at or above the
concentration of the detection limit.

ug/l = ppb

Very truly yours,
FGL ENVIRONMENTAL



Uday Sathe, M.S.
Environmental Chemist

US/JP:m1h



J.G. Patel, M.S.
Environmental Chemist

APPENDIX H

Photographs